

XII. *Contributions towards the Natural History of British Microlepidoptera.* By J. W. DOUGLAS, ESQ.

[Read 5th July, 1852.]

UNDER this title I propose to give a descriptive account of the early state of our native *Tineidæ* as the particulars may from time to time be discovered, accompanied by illustrative figures from the pencil of Mr. William Wing.

When the importance of such a labour is considered, with respect to the natural history and determination of species, the facility of acquiring rare species by a knowledge of their habits and food as larvæ, and also with reference to the wide field there is for research, I trust I may be pardoned for entering on such an extensive arena, and for requesting, as I now do, to be furnished with examples of such larvæ as may occur to collectors. I am also not without hope, that seeing how much light is thrown upon the species of our smaller moths by such investigations as these, our collectors will direct more attention to larvæ than they have hitherto done, and rival our brethren of France and Germany.

While it will thus be seen that the elucidation of the natural history of species is the intention of these memoirs, it may also probably happen, although I see no reason to give the first place to characters derived from larvæ, that some assistance may be derived therefrom towards deciding difficult points in the generic association of species.

Genus GELECHIA, Zeller.

At a cursory glance the three species, *Gelechia contigua*, *blandella*, and *fraternella*, might easily be taken for varieties of one: the difference between *contigua* and *blandella* appears to be more one of colour than of marking, and *fraternella* comes so near to *contigua* that at first it was placed as a variety of it. That these are three good and distinct species will now be satisfactorily shown, and it is hoped that no long period may elapse before the distinctness of *G. marmorea*, *junctella*, *maculiferella*, and *Hübneri*, species also very similar to each other, may be as decidedly made out by the discovery of the earlier states of each.

If in the month of March we walk by the side of a hedge where *Stellaria holostea* grows, we may observe that many of the terminal shoots of the plant are drawn up and frequently discoloured; if we investigate more closely the cause of these appearances, we shall find that the leaves are drawn together by a small whitish-

yellow larva with pink stripes, which devours them from within : later in the season, towards the middle of April, we may notice the flower shoots drawn together in the same way, and on opening them we generally find that the young buds have all been devoured, and the excrements of the voracious larva left in their place. All this is by *G. contigua*.

If we examine the same plant early in May we shall again find the young shoots drawn together, but no longer by the same larva. We now meet with a pale greenish-yellow larva, without any pink stripes : and later, when the seeds are nearly ripe, we find, on opening the capsules, that many of them contain the same greenish-yellow larva, nearly full fed. This is *G. blandella*. The *S. holostea* has thus its young shoots devoured by two enemies, one of which afterwards leaves them for the flower buds, while the other takes to the seeds.

At the beginning of April, if we bring our eyes near the ground in places where *Stellaria uliginosa* grows, and push aside the grass or withered leaves that may cover it, we shall find the young shoots, many of them hardly an inch above the ground, but instead of being of a regular form as healthy shoots should be, they are knobbed and twisted in a very singular way : each of them contains a dirty brown Lepidopterous larva. It may seem incredible that this should be the larva of so scarce a species as *G. frater-nella*, for a glance around will show us it is evidently no rarity, but it is the habit of the perfect insect to keep very quiet, and hence it is rarely seen ; whereas, judging from the abundance of contorted shoots of the *S. uliginosa*, there are few insects more plentiful.

Gelechia contigua, Haworth, Douglas. (Trans. Ent. Soc. Vol. V. p 196.)

Larva (Pl. X. fig. 1).—Length 4 lines.—Robust ; pale dull whitish, with a greenish-yellow tinge, and with many short hairs placed in rows. Head black, second segment black above, with a slight pinky line in the centre ; a pink stripe down the centre of the back, on each side of which are two other stripes of the same colour, that nearest the centre being broader than the other and wavy ; a still slenderer line of the same colour just above the legs. On the top of each segment after the second are four small black dots, the two anterior ones, on the central segments, being nearer to the dorsal stripe than the two posterior ; a row of black dots on the side between the second and third pink stripes, and another row above the legs, one dot being on each segment : on the third,

fourth, and last segments these dots are placed nearly in a transverse line. Six pectoral legs black, eight ventral and two anal legs the colour of the body.

This larva, the discovery of which is due to Mr. Stainton, is found, generally full grown by the middle of April, in the young terminal shoots of *Stellaria holostea* (fig. 1*a*), the leaves of which it agglutinates and twists into a habitation, in and on which it feeds, removing therefrom and forming other similar dwellings as occasion requires.

Pupa (fig. 1*b*).—Brown, with a short anal spine; formed on the ground within a cocoon spun by the larva, to which small particles of earth, &c. adhere.

Imago (fig. 1*c*).—Appears in June and July.

Gelechia blandella (Fischer v. R.), Zeller, Douglas. (Trans. Ent. Soc. Vol. I. (N. S.) p. 246.)

Larva (Pl. X. fig. 2).—Length 4 lines.—Light greenish-yellow. Head black, second segment black above, with a fine white central line, and a small black dot on the side. Each of the other segments bears six very small black dots, whereof four are on the back, placed as in *G. contigua*, and one on each side, from each of them proceeds a short hair: there are also some minor dots, one or two on each segment lower down on the side forming a row: more or less visible according to the age of the larva. Six pectoral legs brownish, the first pair are darker than the other two pairs, the eight ventral and two anal legs are of the colour of the body.

Feeds at first on the young shoots of *Stellaria holostea*, the leaves of which it draws together just like *G. contigua*. It afterwards feeds upon the seeds of the same plant (fig. 2*a*) within the capsules, and is full grown about the middle of June. These particulars were discovered by Mr. Stainton.

Pupa.—Like *G. contigua* and *fraternella*, and formed in a cocoon.

Imago (fig. 2*c*).—Appears in July.

Gelechia fraternella, Douglas. (Trans. Ent. Soc. Vol. I. (N. S.) p. 101.)

Larva (Pl. X. fig. 3).—Length 4 lines.—Robust, light dirty brown, with many short dark hairs, placed in rows. Head small, black; second segment black above, with a fine central white line; four black dots with a white pupil, on the back of each of the other segments, the posterior two being further from the centre than the anterior two, especially on the middle segments, being on

the third, fourth and last disposed more in a transverse line; on the side is a row of black dots, one on each segment, and another similar row lower down above the legs. Six pectoral legs black, eight ventral and two anal legs the colour of the body.

Found from the beginning of April to the middle of May on the young shoots of *Stellaria uliginosa* (fig. 3 a), the leaves of which it fastens together, making a habitation in which it lives and eats, and from which it removes and forms another as often as the supply of food becomes exhausted. Unlike its congeners, it is very dull and inactive in its movements.

Pupa (fig. 3 b).—Brown, with a short anal spine; changes from the larva on the surface of the ground, within a cocoon of earth and small fragments of vegetable matter.

Imago (fig. 3 c).—Appears in July. I described this species in the Transactions of this Society (Vol. I. (N.S.) p. 101) from a specimen taken in Mr. Stainton's hedges, but now, compared with a bred specimen, the colours are dull and faded.

First the perfect insect and then the larva were discovered by Mr. Stainton at Lewisham, and I found the latter at Penge and West Wickham.

Genus COLEOPHORA, Zeller.

The larvæ of this genus are singularly interesting. They make cases, which in the several species differ greatly in form and colour; in these they live and literally move, for they carry them about throughout the whole period of their existence. They feed on the leaves of plants, subsisting on the parenchyma, to obtain which they partially emerge from their cases, and thrust their bodies into leaves between the cuticles, often so far that but a small portion remains in the case, but they appear to have no difficulty in returning. As they grow they enlarge their cases by adding portions of the leaves of the plant upon which they feed, the sutures of the pieces joined on usually remaining visible; they also have the power of forming entirely new cases. As might be expected from these larvæ having to carry such cumbersome cases, their movements are not very active, and in some instances are very grotesque. When full-fed they turn round in their cases, after having made the mouth-end fast, and then become pupæ; and when they assume the perfect state, the pupa skin does not project from the case, but remains within, so that it frequently happens to the collector that he takes cases fastened up, but from which the tenant has escaped.

The habits of the perfect insects are very retired, and it is quite possible for a species to be in abundance in a locality, and yet never be seen; the larvæ, however, cannot so easily escape observation, for from their mode of feeding, ingenious though it seems, and apparently likely to retard their discovery, they are in fact readily detected. The larva attaches its case to the underside of a leaf, and penetrating the lower epidermis, feeds on the parenchyma. The case is out of sight, under the leaf, the larva is partly in the case, partly in the leaf, thus also out of sight; but by eating the parenchyma, it discolours the upper surface, which at that spot appears white, yellow or brown, or at any rate of a different colour from the rest; so soon therefore as we observe this discoloration of the leaf, we turn it over, and there, fast to the underside, find the case of the larva.

The three species of *Coleophora* here mentioned have been discovered within the last few years.

If in February or March we look in a hedge-bottom where *Glechoma hederacea* grows, we shall frequently find white blotches on the leaves, and under these leaves the long brown cases of *albitarsella*.

If early in May we search the *Centaurea nigra*, we may perchance find some transparent pale brown blotches, caused by the larvæ of *Alcyonipennella*; it does not appear nearly so generally distributed as *albitarsella*.

If in April we examine the *Stellaria holostea*, we may observe many plants in which half the leaves have become white; this is the work of *solitariella*, the cases of which will be found attached to the undersides of the leaves.

Coleophora albitarsella, Zeller. (Linn. Ent. IV. p. 378.)

Larva case (Pl. XI. fig. 1).—Length 5 lines.—Black, cylindrical, slightly curved, brownish and flattened at the apex, and there produced on one side into a thin projecting structure like a keel or the blade of an oar; a slightly raised suture also extends along the same side the whole of the remaining length of the case. The margin of the mouth is slightly expanded.

Larva (fig. 1 a).—Length $3\frac{1}{2}$ lines.—Dull, greenish white, a few fine hairs at each extremity; head pale brown; second segment pale brown above, the anterior margin still paler, a faint light line down the centre; third segment with two large black spots, divided by a pale line; fourth segment with two oval black spots; there is also a black dot at the side of the second, third and fourth seg-

ments, and a quadrate black patch on the anal segment. Six pectoral legs slightly brownish, eight ventral and two anal legs concolourous with the body.

The larvæ feed on *Glechoma hederacea* growing in hedges and shady places, adhering to the underside of the leaves, and betraying their presence by the white spots made by the extraction of the parenchyma (fig. 1 *b*). They are hatched in summer, and feed till quite late in the autumn, and are again found active in March, which is the best time to take them, for although they feed till May, they are not easily seen when the plant has grown up.

Imago (fig. 1 *c*).—Appears in June and July.

This species was exceedingly rare in England until Mr. Stainton found the larvæ.

Coleophora Alcyonipennella, Kollar, Zeller. (Lin. Ent. IV. p. 208.)

Larva case (Pl. XI. fig. 2).—Length 4 lines.—Black, with a whitish line along the side, cylindrical, straight, behind the mouth abruptly and shortly curved, the apex triangular.

Larva (fig. 2 *a*).—Length 3 lines.—Dull whitish-yellow, a few fine hairs at each extremity. Head black or black-brown; second segment black above, with a fine white line in the centre, and a black spot on each side; third segment with a long, black, transverse, posterior spot, at each end of which, but anterior, is a somewhat oval black spot, and a small dot below; fourth segment with two black spots on each side; anal segment with a black patch. Six pectoral legs whitish, annulated with brown; eight ventral and two anal legs the colour of the body, the latter pair with a slight spot of black.

This larva feeds on the leaves of *Centaurea nigra* in April and the beginning of May, causing the appearance of white spots (fig. 2 *b*). It was discovered last year at Birkenhead by Mr. C. S. Gregson, and this year I took it at Sanderstead and Lee.

Imago (fig. 2 *c*) appears in June.

Coleophora solitariella, Zeller. (Lin. Ent. IV. p. 397.)

Larva case (Pl. XI. fig. 3).—Length 4 lines.—Straight, slender, three-fourths of the circumference dull brownish-grey; the other fourth whitish, with a very fine raised suture on each portion; apex whitish, triangular; mouth widened, and just behind it the case is curved obliquely.

Larva (fig. 3 *a*).—Length $3\frac{1}{2}$ lines.—Pale dull ochreous. Head light brown; second segment dark brown above, with a fine

white line down the centre, anterior margin pale, at the side a black dot; third segment with two posterior, triangular, brown spots divided by a fine white interval; anteriorly and towards each side is a pointed black dot, and a black dot on each side; fourth segment with two black dots somewhat removed from the centre, and on the side one similar black dot; the anal segment with a nearly quadrate black patch, and a small black dot at the base of the short anal legs. Six pectoral legs pale brownish, eight ventral and two anal legs the colour of the body. Feeds on the leaves of *Stellaria holostea* (fig. 3 b), which thereby become discoloured.

Last autumn Messrs. Grant and Dunning found several of the cases at Putney on *Stellaria holostea*, and the larva lived through the winter. In April this year, Mr. Stainton discovered the larvæ on the same plant growing in hedges at Lewisham. The specific name has proved to be singularly inappropriate, for the larvæ are quite gregarious, five or six being commonly seen on a shoot of the plant *Stellaria*: but they are difficult to rear.

Imago (fig. 3 c) appears in July. Zeller described this species from a single specimen bred from a case found by him attached to grass; it is very rare in collections in this country.

XIII. Notes on the Development of *Osmia parietina*, and other British Insects. By F. SMITH, ESQ.

[Read August 2nd, 1852.]

IN the ninth volume of the "Zoologist" I published some account of the habits of *Osmia parietina*, a little bee which had selected the under side of a stone on which to affix the balls of pollen on which to deposit its eggs. This stone was discovered in early spring on the Grampian Hills, near Perth, too early in the season for any of the brood to have issued from the cocoons. At the time of its discovery about one-third of the cocoons were empty, showing that at least that portion of the mass had been developed during the previous season. The only difficulty was this—had the parent bee or bees deposited on the same stone two successive seasons? The stone came into my possession in the autumn of 1851; and in the month of November, finding that a number of the cocoons were still unopened, I cut one or two in such a manner that I could raise as it were a trap-door and watch the progress of the bees. All that I opened contained larvæ. After closing them, and carefully preventing the admission of air,